Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the application.

1-7. (Canceled)

8. (New) A method for detecting and measuring a phase of a response signal of a biological system, comprising:

(1) subtracting an estimated response signal of the biological system from the response signal to produce a first difference signal;

(2) multiplying the first difference signal by a first factor to produce a first product signal;

(3) multiplying an estimated phase signal of the response signal by a second factor to produce a second product signal;

(4) subtracting the second product signal from the first product signal to produce a second difference signal;

(5) integrating the second difference signal with respect to time to produce the estimated phase signal; and

(6) presenting the estimated phase signal in a visual form, wherein the estimated phase signal is indicative of a condition of the biological system.

9. (New) The method of claim 8, wherein the estimated response signal is a function of the estimated phase signal.

10. (New) The method of claim 9, wherein the function is a sine function.

11. (New) The method of claim 9, wherein the subtracting the estimated response signal from the response signal to produce the first difference signal, the multiplying the first difference signal by the first factor to produce the first product signal, the multiplying the estimated phase signal by the second factor to produce the second product signal, the subtracting the second product signal from the first product signal to produce the second difference signal, and the integrating the second difference signal with respect to time to produce the estimated phase signal are repeated so that the estimated phase signal reaches a steady state.

12. (New) The method of claim 8, wherein the first factor is equal to a product of a third factor multiplied by a fourth factor and the third factor is a function of the estimated phase signal.

13. (New) The method of claim 12, wherein the function of the estimated phase signal is a cosine function.

14. (New) The method of claim 12, wherein the fourth factor is a function of a difference between a variable that represents the phase of the response signal and a variable that represents the estimated phase signal.

15. (New) The method of claim 14, wherein the function of the difference between the variable that represents the phase of the response signal and the variable that represents the estimated phase signal is a covariance function.

16. (New) A method for detecting and measuring a phase of a response signal of a biological system, comprising:

(1) determining a rate of change with respect to time of an estimated phase signal of the response signal, wherein the rate of change with respect to time of the estimated phase signal is a function of the response signal;

(2) integrating the rate of change with respect to time of the estimated phase signal; and

(3) presenting the estimated phase signal in a visual form, wherein the estimated phase signal is indicative of a condition of the biological system.

17. (New) The method of claim 16, wherein the determining and the integrating are repeated so that the estimated phase signal reaches a steady state.

18. (New) The method of claim 16, wherein the function of the response signal comprises a function of a difference between an estimated response signal of the biological system and the response signal.

19. (New) The method of claim 18, wherein the estimated response signal is a function of the estimated phase signal.

20. (New) The method of claim 18, wherein the function of the response signal further comprises a function of a difference between the estimated phase signal and the difference between the estimated response signal and the response signal.

21. (New) A system for detecting and measuring a phase of a response signal of a biological system, comprising:

an input configured to receive the response signal;

a processor coupled to the input and configured to determine a rate of change with respect to time of an estimated phase signal of the response signal and to integrate the rate of change with respect to time of the estimated phase signal, wherein the rate of change with respect to time of the estimated phase signal is a function of the response signal; and

a first output coupled to the processor and configured to present the estimated phase signal in a visual form, wherein the estimated phase signal is indicative of a condition of the biological system.

22. (New) The system of claim 21, wherein the processor is further configured to produce an estimated response signal of the biological system as a function of the estimated phase signal.

23. (New) The system of claim 21, wherein the processor is configured to subtract an estimated response signal of the biological system from the response signal to produce the function of the response signal.

24. (New) The system of claim 23, wherein the processor is configured to subtract the estimated phase signal from a difference of the estimated response signal subtracted from the response signal to produce the function of the response signal.

25. (New) The system of claim 23, further comprising a second output coupled to the processor and configured to present the estimated response signal.

26. (New) The system of claim 23, further comprising a Kalman filter coupled to the processor and configured to reduce noise in the difference of the estimated response signal subtracted from the response signal.

27. (New) The system of claim 26, wherein the Kalman filter comprises a function of a difference between a variable that represents the phase of the response signal and a variable that represents the estimated phase signal.